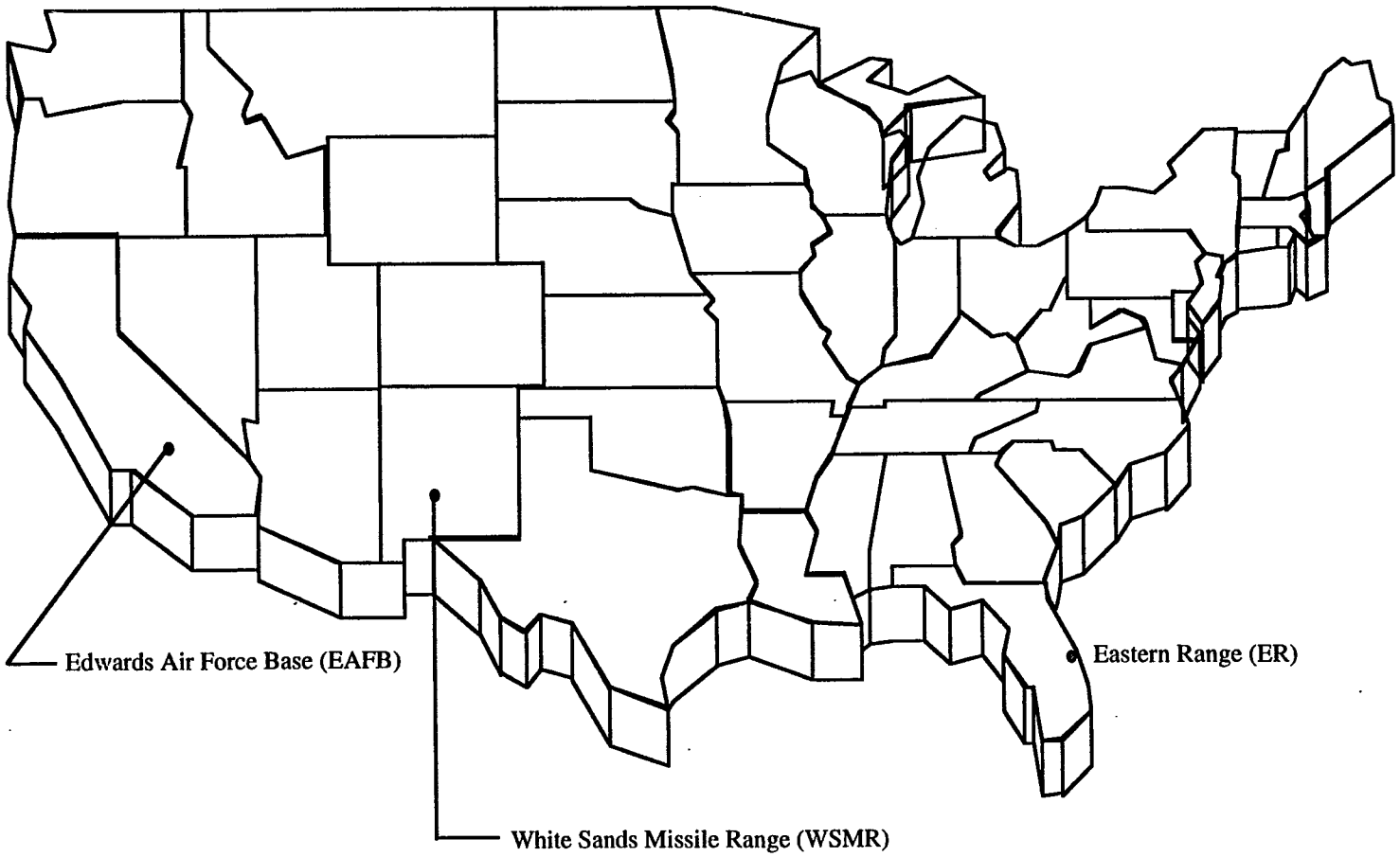

Figure 2.3-3. Locations of Three Takeoff Site Alternatives

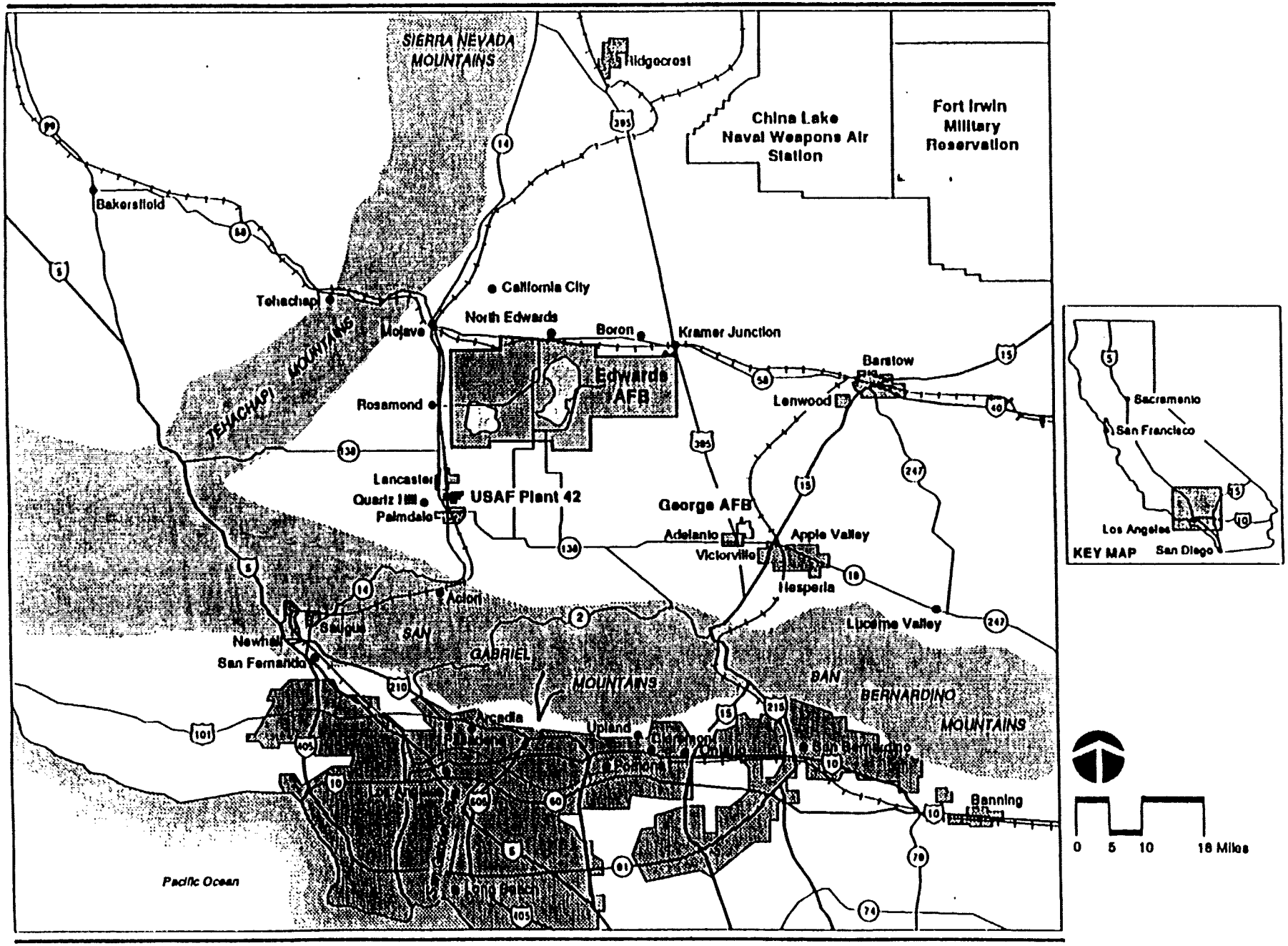

Figure 2.3-4. Edwards Air Force Base

Valley in the western part of the Mojave Desert. EAFB currently hosts the Air Force 412th Test Wing, which operates the AFFTC and performs testing and evaluation of aerospace vehicles, including research aircraft, remotely piloted vehicles and drones, and full-scale engineering aircraft. The 412th Test Wing provides engineering expertise to develop, test, and evaluate operational capabilities of aircraft and aeronautical weapon systems for use by the USAF. The Test Wing provides technical capability to ensure compatibility of facilities, instrumentation, test techniques, and analytical methods to support test and evaluation programs. EAFB is the primary western U.S. landing site for Space Shuttle flights. (EAFB 1994-A)

AFFTC is tasked to support the Air Force Materiel Command (AFMC) by conducting and supporting testing of both manned and unmanned aerospace vehicles. The mission involves not only all aspects of testing air vehicles, but includes flight evaluation and recovery of research vehicles, development testing of aerodynamic decelerators, and operation of the Air Force Test Pilot School. AFFTC is best known for X-series experimental aircraft tests and Space Shuttle recovery. However, the majority of the workload consists of testing total weapons systems, including major subsystems, as a part of cradle-to-grave AFMC systems development and support. AFFTC also has an array of ground test facilities, including the West Base Complex, for complete testing of fully integrated avionics in a simulated flight environment. A complete Class II modification capability exists to design, manufacture, and install instrumentation and make other changes to the test article as required for the test program. Ground vibration, storeweight, and moment facilities are available for structures testing, as well as special data analysis equipment for loads and flutter tests. (EAFB Undated)

DFRC is a tenant organization on EAFB. It comprises 340 ha (830 ac) on the shore of Rogers Dry Lakebed. DFRC is an aeronautical research facility developing new technologies to improve aircraft flight control components and systems and to transfer new concepts to the U.S. aerospace industry for commercial and military applications. In general, DFRC maintains its own infrastructure while reimbursing EAFB for utilities. (DFRC 1996)

PL is an EAFB tenant located on Leuhman Ridge east of Rogers Dry Lake. Facilities on Leuhman Ridge have been used for test firings of rockets and engines for a number of years. The USAF recently announced a plan to consolidate the nationwide PL facilities at Kirtland AFB, New Mexico. The plan will only move a portion of PL; the test stands will remain under PL's authority. The engine test stands on Leuhman Ridge will remain and can be used for this alternative regardless of whether PL is the organization operating the facility. (EAFB 1992)

USAF Plant 42 (Figure 2.3-5) is an existing, Government-Owned/Contractor-Operated (GOCO) facility in Palmdale, California, approximately 48 km (30 mi) south of EAFB. It comprises approximately 2,071 ha (5,117 ac) of land mass. There are several civilian contractors at AF Plant 42, predominantly Lockheed-Martin, Northrop Grumman, and Rockwell. Lockheed-Martin and Rockwell have other facilities adjacent to the southern border of the plant. AF Plant 42 has a history of constructing test aircraft, performing final assembly, and supporting flight tests for aircraft and aerospace vehicles, including the SR-71 Blackbird, F-111 fighter, B-1 and B-2 bombers, and Space Shuttle. The majority of the plant is devoted to airfield, industrial, and vacant land use categories, with smaller areas of administrative and aviation/test program support. The central portion is dominated by Runways 07/25 and 04/22, which generally trend east/west. A 150 m

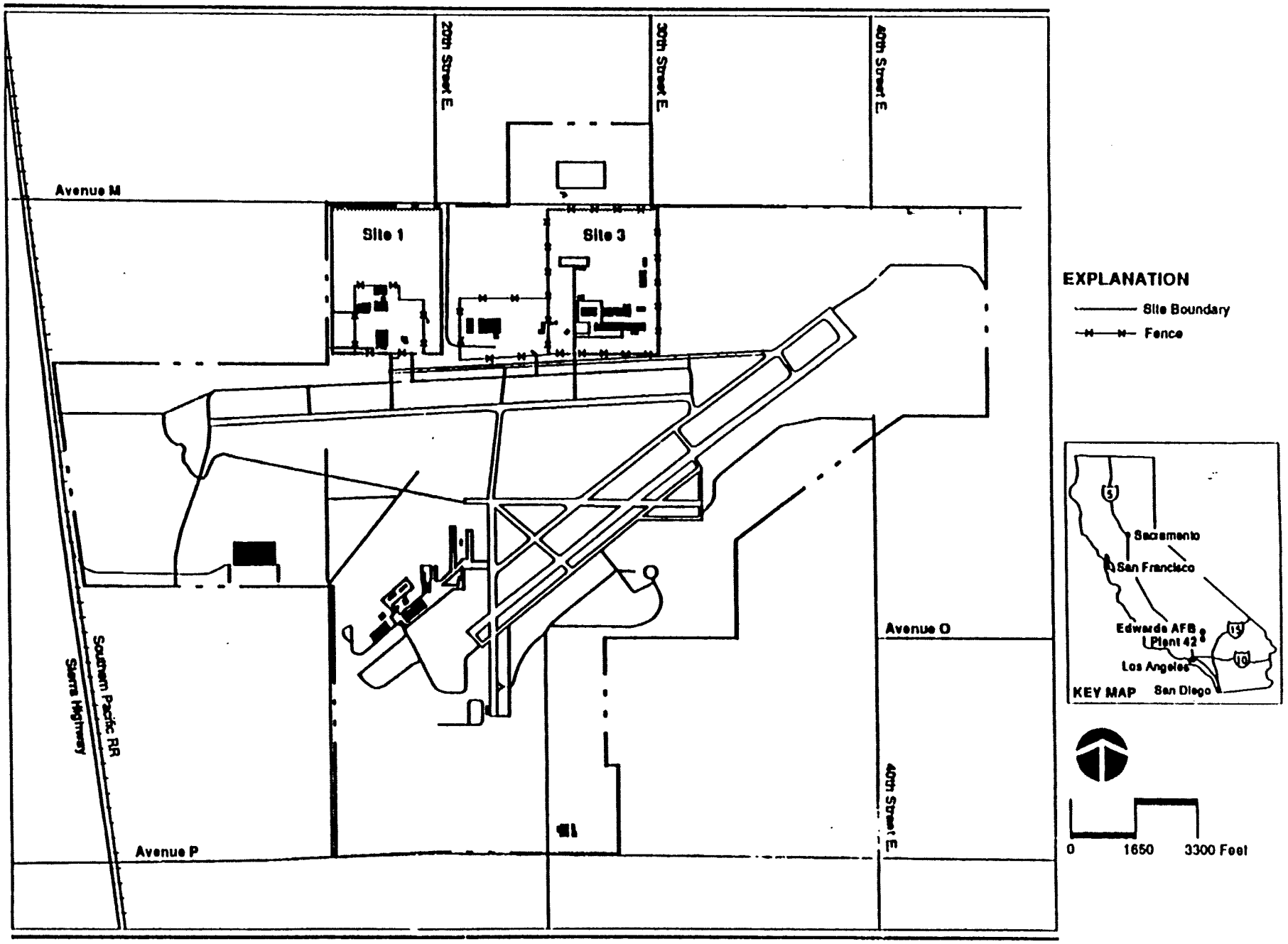

Figure 2.3-5. U.S. Air Force Plant 42

(500 ft) wide buffer zone conforms to the plant's exterior property line and establishes a security buffer for plant activities. (EAFB 1992)

Four takeoff and landing sites are being considered for the X-33 Program at EAFB: South Base Site, Space Port 2000 Site-1, Space Port 2000 Site-2, and NASA-North Base Site are shown in Figure 2.3-6.

South Base Site

The proposed X-33 South Base site is located at the original site of flight operations at EAFB. The B-2 bomber hangar and office buildings are located in this area, and it is from this location that B-2 flight operations are conducted. The proposed site is located at the end of an abandoned runway that branches off diagonally from South Base runway 6/24 as shown in Figure 2.3-7. The proposed takeoff stand is approximately 1.8 km (1.1 mi) from the B-2 facility. The landing pad for a VTVL X-33 would be located to the northeast. One option would be to place the X-33 in the B-2 hangar between flights and tow it on a multi-tire dolly or its landing gear to and from the takeoff stand and hangar via the abandoned runway. The proposed site is also located approximately 1.34 km (0.83 mi) from Building 730, a munitions integration test facility, which could be evacuated prior to takeoff if required. Midway between Building 730 and the South Base Site are the South Base Munitions Area storage bunkers. Use of these bunkers for munitions storage is being phased out, and by the first flight of the X-33 all munitions will have been removed from the area. Water, power, and communications lines, including fiberoptic cables, extend to Building 730. This is the point from which utility extensions would be extended to the proposed site.

Space Port 2000 Site-1

Space Port 2000 Site-1 is located southwest of the South Base area on the edge of Rogers Dry Lake. The X-33 takeoff stand would be located approximately 5 km (3 mi) from the B-2 facility and approximately 3 km (2 mi) from Building 730. The site option provides additional separation distance from existing facilities, if required, based on explosive safety/quantity-distance (ES/QD), takeoff noise, and debris pattern analyses. The VTVL landing pad would be located northeast of the takeoff stand. A tow route on paved two-lane roads is available from the B-2 hangar to the proposed site. From Building 730, the first 2.6 km (1.6 mi) of roadway would require repaving and the final 0.5 km (0.3 mi) of roadway would require new construction. Water, power, and communications would be extended 3.1 km (1.9 mi) to the site from Building 730.

Space Port 2000 Site-2

Space Port 2000 Site-2 is located northwest of Space Port 2000 Site-1 as shown in Figure 2.3-7. This site is located further east from Space Port 2000 Site-1, providing a wider takeoff azimuth (trajectory or path) and vertical landing approach azimuth capability, but reducing separation distances from existing facilities. An existing paved road running through the site would provide a tow route from the B-2 hangar. Utilities would be extended 2.1 km (1.3 mi) to the site from Building 730.

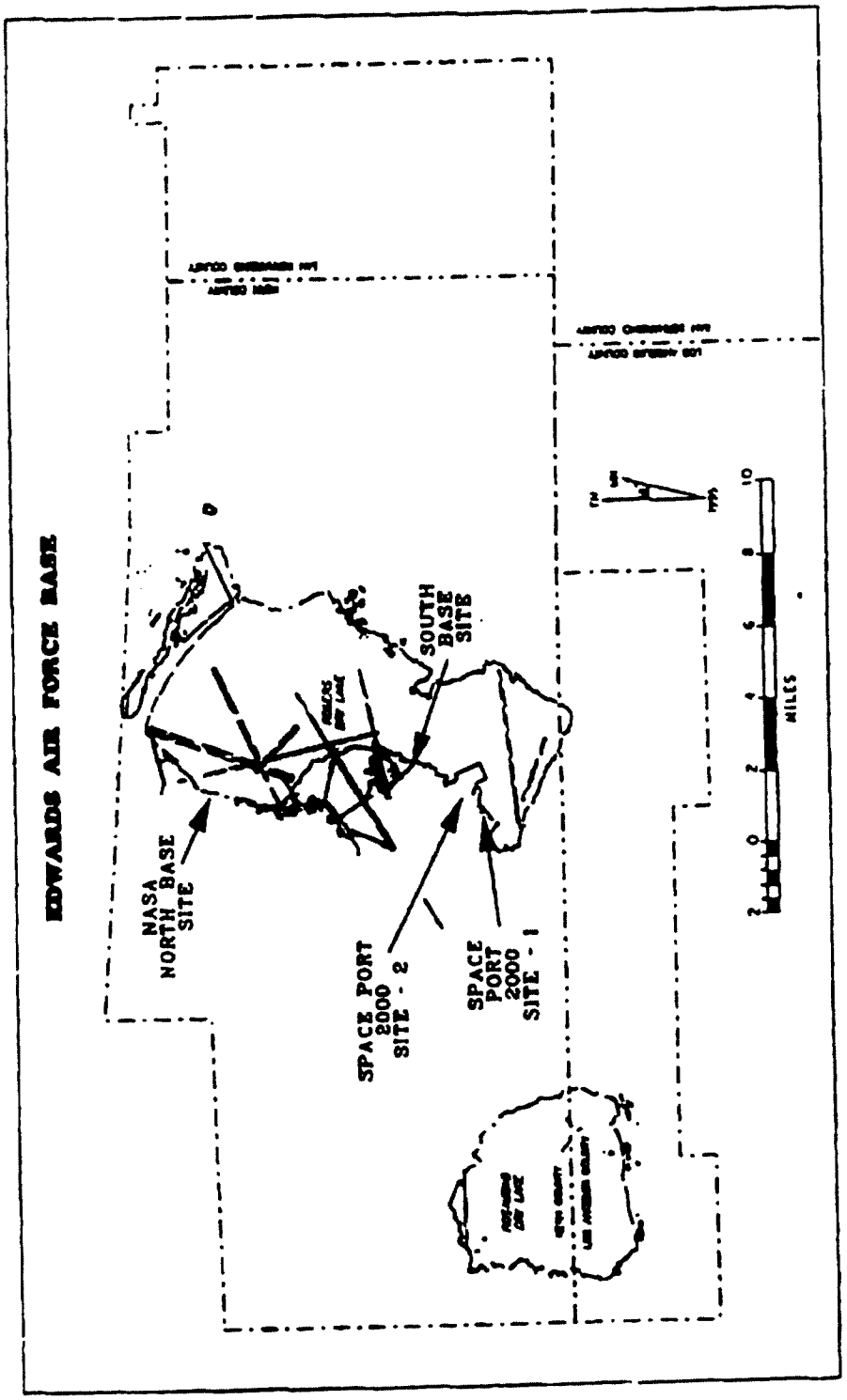

Figure 2.3-6. Proposed Takeoff Sites on EAFB

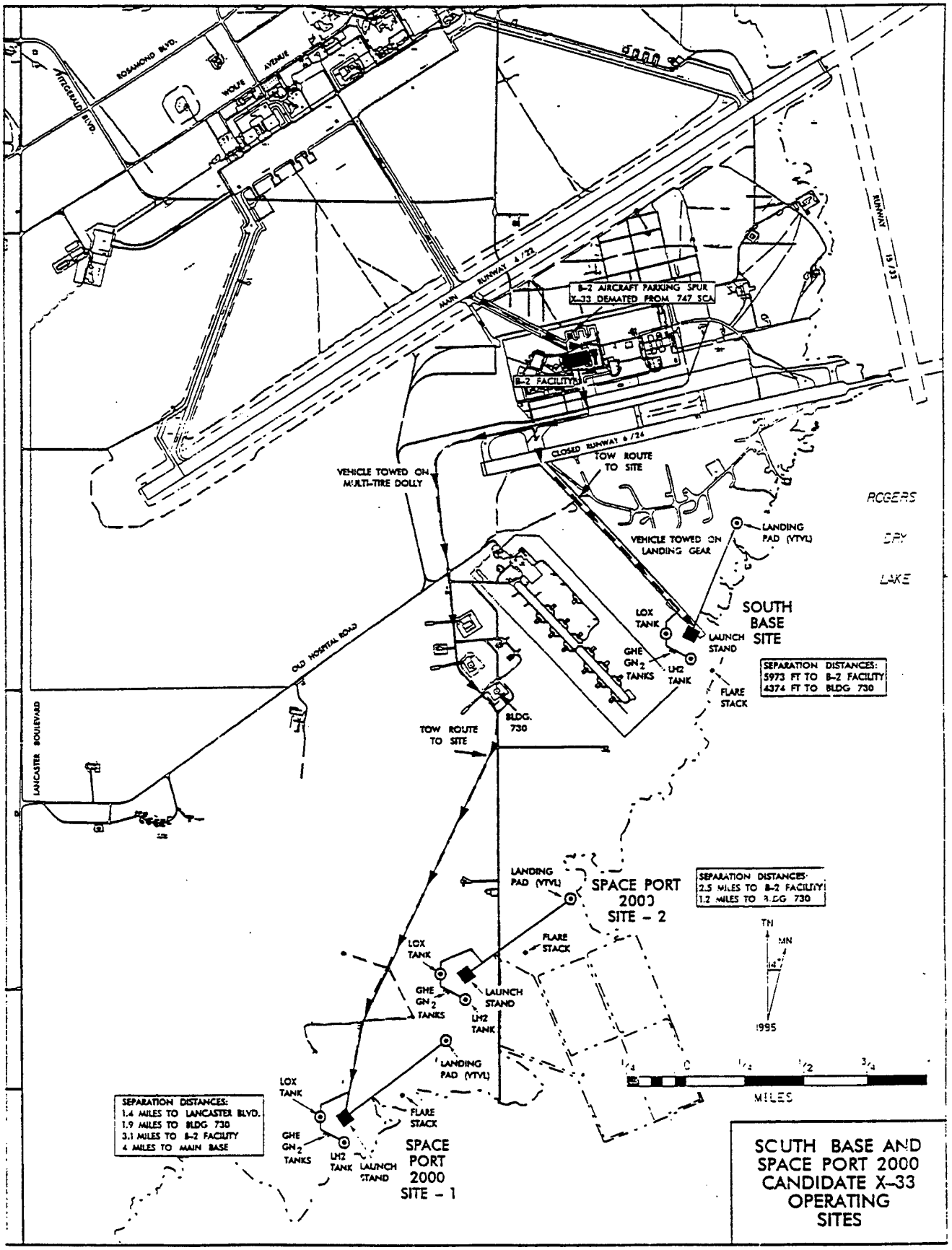

Figure 2.3-7. Proposed Takeoff and Landing Sites on EAFB South Base

NASA-North Base Site

The NASA-North Base site is located north of DFRC and south of the Edwards North Base facility at an abandoned jet engine test facility. The facility was used by General Electric Corporation for open-air testing of engines on B-2 and F-22 aircraft. The proposed site location is shown in Figure 2.3-8 and is approximately 1.3 km (0.8 mi) from the Space Shuttle Mate/Demate Device (MDD), approximately 1.3 km (0.8 mi) from the Space Shuttle hangar, and approximately 1.8 km (1.1 mi) from the DFRC Integrated Test Facility (ITF). The proposed site provides easy access to existing Space Shuttle related facilities at DFRC. A paved road connects to DFRC from which a taxiway provides a tow route from the Edwards Main Base runway to the site. Water, power, and communications are also available.

2.3.3.2 WSMR/WSTF

WSMR (Figure 2.3-9) is a major DOD range and test facility located near Las Cruces, New Mexico. The range possesses unique characteristics necessary for the U.S. Army, USAF, U.S. Navy (USN), NASA and other federal and commercial testing concerns to conduct safe, large-scale experiments on advanced weapons and space flight systems. WSMR covers approximately 828,800 ha (2,048,000 ac) in south central New Mexico and is the largest overland test range in the Western Hemisphere. The primary mission of WSMR is operation of a National Range in accordance with direction from the U.S. Army Test and Evaluation Command (TECOM). The mission includes: conduct of range instrumentation research and development; development tests of air-to-air, air-to-surface, surface-to-air, and surface-to-surface missile systems; dispenser and bomb drop programs; gun system testing; target systems; meteorological and upper atmospheric probes; equipment, component. and subsystem programs; high-energy laser programs; and special tasks. (WSMR 1996-A)

The main launch complexes encompass approximately 240 ha (600 ac) north of Nike Avenue and east of the Main Post. It contains eight active launch complexes (LC-32 to LC-38 and LC-50). They support ground-to-ground and ground-to-air missile launches and the Navy Gun Program. Six additional launch complexes have been set aside for future development. (WSMR 1996-A)

WSTF (Figure 2.3-10) is a NASA facility located on 24,605 ha (60,800 ac) along the western flank of the San Andreas Mountains in southwestern New Mexico. It is situated in an isolated area on WSMR to limit effects of the inherent test hazards of the installation on the surrounding population. The site comprises an industrial area and a surrounding buffer zone. Placement of special test equipment in the buffer zone requires prior approval from the WSMR Master Planning Board and the Commanding Officer; however, WSTF may make modifications to the industrial area without WSMR's approval. WSTF provides expertise and infrastructure to test and evaluate spacecraft materials, components, and propulsion systems. (WSMR 1994)

The two proposed WSMR takeoff sites for the X-33 are the WSMR LC-39 launch complex on Nike Avenue and an area near the existing test site used for the DC-X and Clipper Graham Programs at White Sands Space Harbor (WSSH).

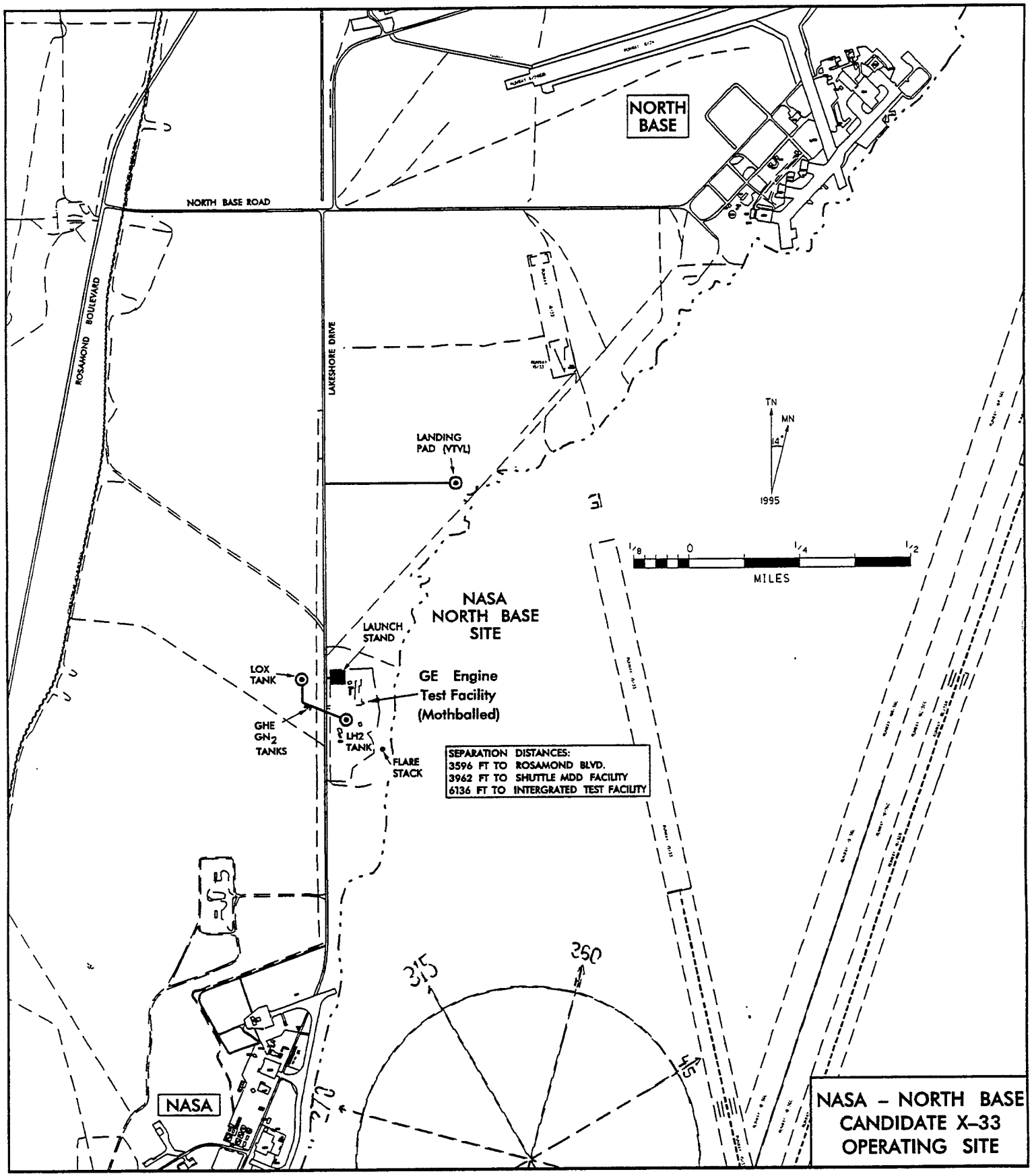

Figure 2.3-8. Proposed Takeoff and Landing Site on EAFB North Base

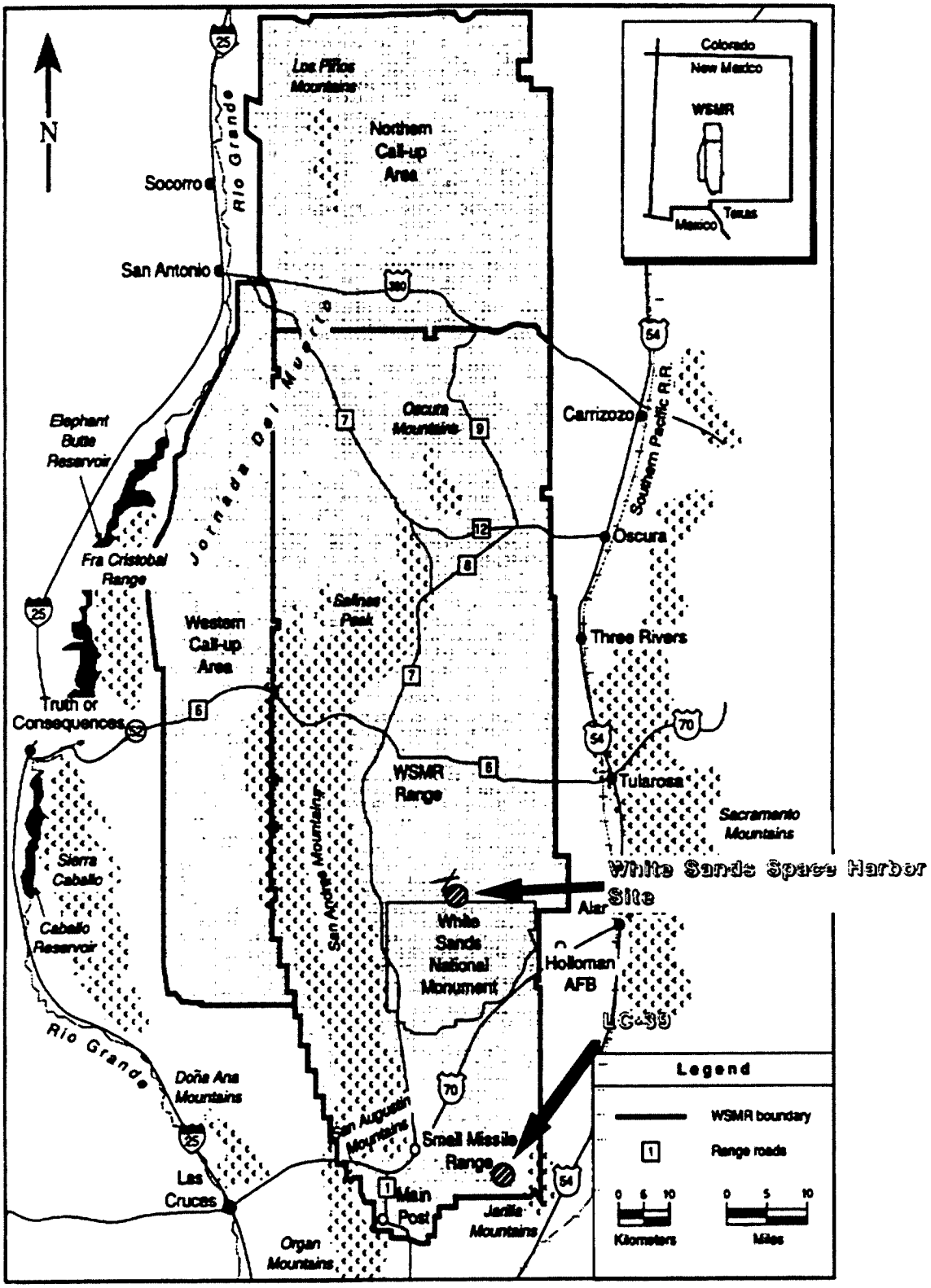

Figure 2.3-9. White Sands Missile Range